

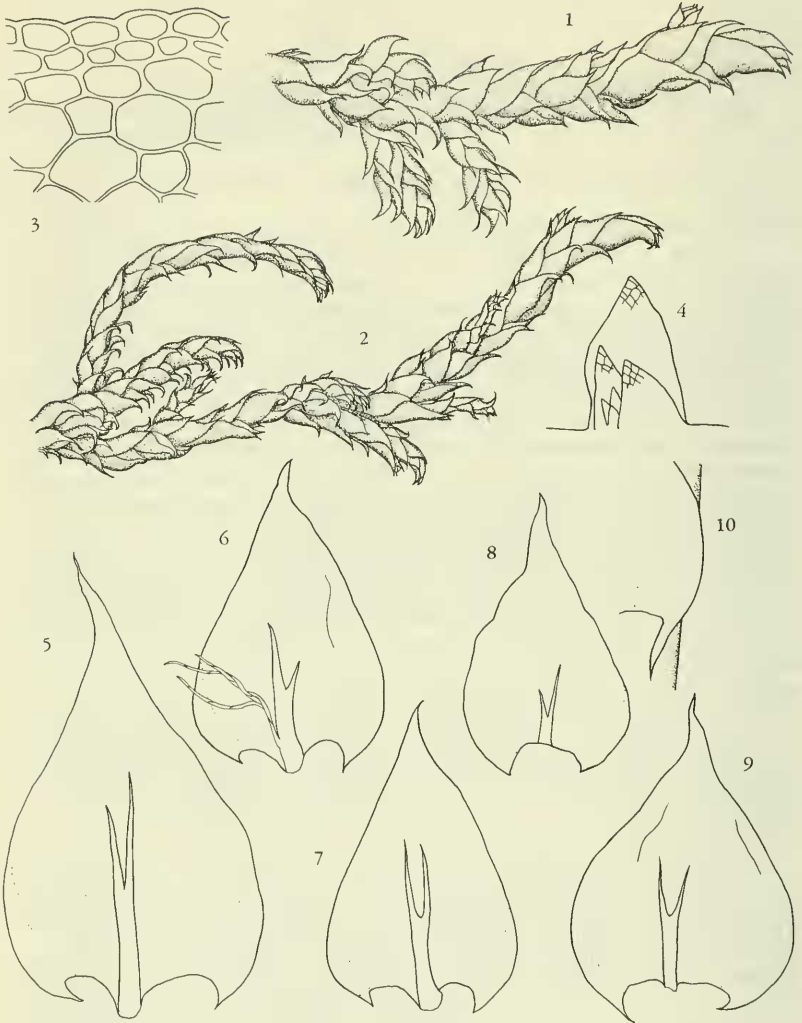
GARYSMITHIA BIFURCATA
A NEW GENUS AND SPECIES OF LESKEACEAE
(MUSCI) FROM ALASKA AND COLORADO

W. C. Steere¹

During my identification of the bryophytes collected by Dr. Gary Smith in Arctic Alaska during the summer field season of 1966, I encountered a sterile pleurocarpous moss that was totally unfamiliar to me. Even the family to which it belonged was not readily apparent. Soon thereafter, I received an unknown moss for identification from Dr. F. J. Hermann, collected in Mt. McKinley National Park in 1967, which proved to be the same thing. Among a group of my own Arctic Alaskan collections that I had segregated out as serious puzzles for future study, I found another specimen of this unknown moss, collected in the same general area as Smith's specimen. More recently, Dr. Hermann sent me a specimen of this same moss from Colorado, which he had collected in 1976, but did not immediately recognize. Realizing that this moss had a wider geographical distribution than had seemed likely at first, I sent a sample to Barbara M. Murray, at the University of Alaska, with the request that she send me anything that matched it, and received, almost by return mail, two specimens which she had collected in 1976 in the eastern Brooks Range. If this moss has the same pattern of geographical distribution as, for example, *Oreas martiana*, it should also occur in the Canadian Rockies. However, when I sent a specimen to Dr. Dale Vitt, at the University of Alberta, for comparison with his unknowns, he replied that it was a species which he had never before seen.

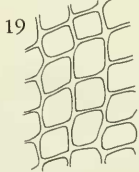
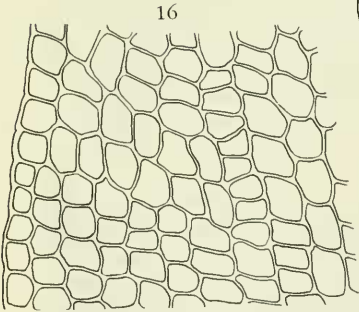
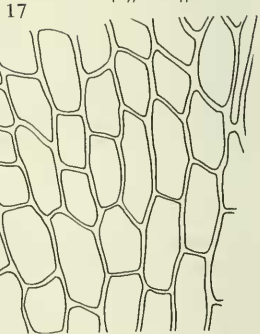
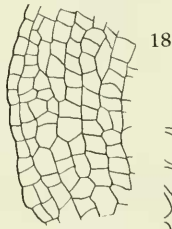
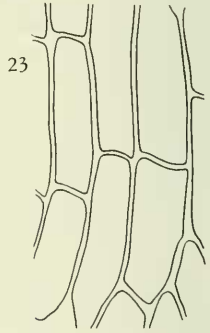
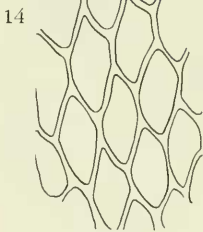
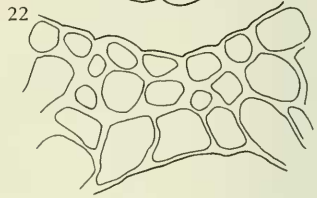
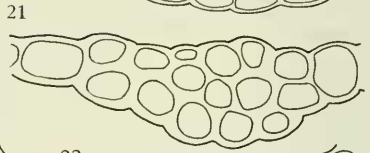
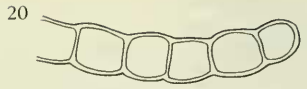
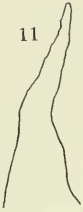
GARYSMITHIA BIFURCATA Steere, gen. et sp. nov. Leskeacearum; Plantae caespitosae, paulum ramosae. Caules subturgidi vel julacei. Folia ovato-deltaidea vel cordata, acuta vel acuminata, imbricata ac appressa, homomalla vel subsecunda, praecipue ad apicem caulis substratum versus curvata, distincte decurrentia. Costa e basi valida indivisa deinde plerumque bifurcata, longitudinem folii 1/2 vel (raro) 2/3 attingens. Foliae cellulae omnes verruculosae (subtiliter papillo-sae), medianae brevi- vel elongato-rhombicae, marginales abbreviatae, centrales elongatae, et eae utriusque anguli basalis quadratae valde delineatae secus marginem per folii longitudinem 1/4 extensae. Gametangia capsulaeque desunt.

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Plants small to medium in size, caespitose, dull yellowish to pale brown, not at all green and not shining, branching sparse and irregular, never pinnate. Leafy stems interwoven, 1-2cm long, 0.4-0.6mm in diameter, usually appearing julaceous, especially when dry, because of the imbricate-appressed leaves. Leaves convex, ovate-deltoid to cordate, acute to acuminate, somewhat homomallous to subsecund, turned toward the substratum, more conspicuously so at the stem apex, 1-1.5(-2)mm long, 0.5-0.7mm wide, distinctly decurrent at basal corners as a narrow wing 1-2 cells wide and 5-7 cells long. Costa variable from leaf to leaf on the same plant, reaching 1/2 (rarely 2/3) the length of the leaf, usually stout at base, bifurcating above into two nearly parallel to divergent, equal or nearly equal branches, which disappear at their apex into the cells of the lamina, occasionally branching from the base of the leaf, only rarely undivided, the stout basal part of the costa occasionally producing from one to many conspicuous yellowish-brown rhizoids along its length. Leaf margins plane, entire or minutely serrulate from the outward projection of cell corners, especially in the upper half and at the apex. Leaf apex short- or long-acuminate, infrequently consisting of a filiform series of 1-4 elongated single cells, the leaf tip incurved, recurved or curved to one side, depending on the orientation of the leaf on the stem with respect to the substratum. Leaf cells thick-walled, short- to elongated-rhomboidal, (20-)26(-34) microns long, (7-)10(-13) microns wide, shorter at the margins, more elongated toward, and at the center, the basal angles of the leaf filled with a large, conspicuous, and well demarcated area of crowded, rectangular cells that runs up the basal leaf margin to approximately 1/4 of the leaf length, at least some of the basal cells transversely elongated, 10-16 microns wide and 7-11 microns high, gradually becoming isodiametric, usually quadrate, eventually merging with the short-rhombic to rectangular cells above. Cells over the basal part of the costa on both sides of leaf much longer, narrower, and thicker-walled than the cells of the lamina; cells over the branches of the costa identical to the cells of the lamina in size and shape but usually more strongly colored; all leaf cells finely papillose, most con-

FIG. 1-10. Garysmithia bifurcata. Fig. 1-2, habit drawings of stems, showing homomallous leaves, X9. Fig. 1 in moist condition, Fig. 2 in dry condition. Fig. 3, detail of cross-section of stem, showing smaller, thicker outer cells, X390. Fig. 4, pseudoparaphyllia of stem, X99. Fig. 5-9, leaves, showing variation of costa, size and shape, X39. Fig. 6 shows rhizoids on basal stouter part of costa. Fig. 10, decurrent basal corner of leaf, X99.



spicuously so near the costa, with numerous papillae per cell. Sexual organs and sporophyte not found on any of the specimens.

On non-calcareous rock faces or in rock crevices.

TYPE: ALASKA: Ogotoruk Creek, Cape Thompson, Brooks Range, rock ledge, with Orthotrichum pylaisii Brid. (2 July 1966, G. L. Smith A304) NY (HOLOTYPE), ALA, ALTA, HIRO, MICH, NICH.

OTHER SPECIMENS EXAMINED: ALASKA: Ogotoruk Creek, near Cape Thompson, W end of Brooks Range (Point Hope Quadrangle), 68° 06'N, 165° 45'W, on thin soil over rock on mountainside (21 July 1965, W. C. Steere 650721-12) NY; Yukon River-Prudhoe Bay Haul Road just E of Galbraith Lake (Philip Smith Mountains Quadrangle), 68° 30'N, 149° 25'W, on conglomerate outcrop, 1220m alt. (20 July 1976, Barbara M. Murray 76-290B; 76-306) ALA, NY; Mt. McKinley National Park, just W of Polychrome Pass, on face of granite outcrop (Marmot Rock), 3800ft alt. (31 July 1967, F. J. Hermann 21533) NY. COLORADO: Hinsdale County, Cebolla Creek, vertical face of granite bluff, Cebolla Campground, 15mi E of Lake City, 9300ft alt. (20 July 1976, F. J. Hermann 27230) NY.

In the absence of sporophytes, it is difficult to assign this plant to any known genus, or for that matter, to any particular family of mosses. I have placed it in the Leskeaceae largely because of its minutely papillose cells. It has been assigned there more as a matter of convenience than through conviction, since the julaceous stems and

FIG. 10A-23. Garysmithia bifurcata. Fig. 10A, entire individual leaf, X39. Fig. 11, leaf apex, X99. Fig. 12, apex of leaf, showing cellular detail, X390. Fig. 13, young rhizoids arising from dorsal side of costa, X99. Fig. 14, cellular detail of upper central part of leaf, X390. Fig. 15, cellular detail of upper part of leaf margin, X390. Fig. 16, cellular detail of upper part of specialized alar group, X375. Fig. 17, cellular detail of leaf base near costa, X375. Fig. 18, cellular detail of lower part of specialized alar group, X197. Fig. 19, enlarged drawing of same tissue as Fig. 18, X390. Fig. 20, cross-section of leaf at upper margin, X390. Fig. 21, cross-section of leaf at upper center, through one branch of costa, X390. Fig. 22, cross-section of leaf near base, through lower and stouter part of single costa, X390. Fig. 23, epidermal cells of branch, X390.

Original pencil drawings for all illustrations were made by Dr. Zennoske Iwatsuki with a camera lucida, and the inking, stippling, and composing of the plates was done by Miss N. Ando, both of the Hattori Botanical Laboratory, Nichinan, Japan.

the cellular areolation, especially the dense alar groups of quadrate cells, suggest the Leucodontaceae.

A specimen of Garysmithia was sent to Dr. H. Ando, of Hiroshima University, who has monographed the genus Homomallium, since the homomallous leaves suggest the possibility of relationship with that genus. His response is so interesting that I take the liberty of quoting from it (pers. comm., 13 April 1977): 'In microscopical observation, your specimen is quite different and is certainly a new moss which I have never seen. I do not think it is a Homomallium. As to the family position I cannot give a decisive conclusion. It is connected with the Leucodontaceae through Pterogonium; on the other hand, with the Leskeaceae through Pseudoleskeella tectorum. At any rate I don't think that it belongs in the Hypnaceae.'

All of the Alaskan specimens were collected without being recognized in the field as something of special interest, so that it would be difficult indeed to find the exact localities again. However, Dr. Hermann believes that he can relocate the Colorado station, and it is possible that sporophytes will eventually be found in populations that are kept under observation over a period of several years.